



## 基于谱方法的管内非牛顿流体非定常流动

(西南民族学院物理系, 四川 成都610041)

### Unsteady Flow of Non-Newtonian Fluid in Pipe by Spectral Method

(Dept.of Physics,Sowthwest University for Nationalities,Chengdu 610041,Sichuan China)

- 摘要
- 参考文献
- 相关文章

全文: PDF (2180 KB) HTML (1 KB) 输出: BibTeX | EndNote (RIS) 背景资料

**摘要** 以上随体Maxwell流体为非牛顿流体介质,探索了一种用谱方法解析处理水平圆管内非牛顿流体非定常流动的方法.该非定常问题归结为一个非线性二阶偏微分方程的求解问题.用谱方法将非线性二阶偏微分方程求解问题化为常微分方程组Chebyshev多项式数的近似问题,用Laplac变换法和本征值方法求解常微分方程组得到问题的解析结果.

**关键词:** 谱方法 非定常流动 Chebyshev多项式

**Abstract:** In the present investigation,the unsteady flow of upper-convected Maxwell fluid in a horizontal circular pipe is studied by spectral method.The unsteady problem is mathematically reduced to a partial differential equation of second order.By using spectral method the partial differential equation can be reduced to a system of ordinary differential equations for different terms of Chebyshev polynomials approximations.The ordinary differential equations are solved by the method of Laplace transform and the eigenvalue method that led to an analytical form of the solutions.

**Key words:** spectral method unsteady flow Chebyshev polynomial

**服务**

- ▶ 把本文推荐给朋友
- ▶ 加入我的书架
- ▶ 加入引用管理器
- ▶ E-mail Alert
- ▶ RSS

**作者相关文章**

- ▶ 付强

#### 引用本文:

付强. 基于谱方法的管内非牛顿流体非定常流动[J]. 吉首大学学报自然科学版, 2002, 23(4): 12-18.

FU Qiang. Unsteady Flow of Non-Newtonian Fluid in Pipe by Spectral Method[J]. Journal of Jishou University (Natural Sciences Edit, 2002, 23(4): 12-18.

[1] HAN S F.Continuum Mechanics of Non-Newtonian Fluids[M].Chengdu:Sichuan Press,1988.  
 [2] PEGREET R,THOMS D T.Computational Method for Fluid Flow Dynamics[M].New York:Springer-Verlag,1984.  
 [3] FU Q,HAN S,WU C Q.Spectral Method for Approaching to Unsteady Flow of Non-Newtonian Fluids[J].Sichuan U.U.,1998,2 (3) : 105-112.  
 [4] HAN Shi-fang,WU Ye-qing.A Study on Unsteady Flow of Upper-convected Maxwell Fluid in Tube[J].1990,(5): 519-525.  
 [5] FU Q,ZHANG C Y.The Problem of Radical Form in Spectral Method[J].J. of Southwest Nationalities College,1998,75(2): 28-32.

[1] 夏颖,许贵桥.一种拟Grünwald插值算子在 $B_{\alpha,\beta}$ 空间中的收敛速度[J].吉首大学学报自然科学版,2009,30(4): 19-22.  
 [2] 项雪艳,何倩,杨文善.一些函数基于Chebyshev多项式的收敛性[J].吉首大学学报自然科学版,2007,28(2): 25-27.  
 [3] 龚西平,李金才,赵文涛,孙安香.数值天气预报全球谱模式的数值计算过程[J].吉首大学学报自然科学版,2004,25(2): 10-14.  
 [4] 龚西平,李金才,赵文涛,孙安香.数值天气预报全球谱模式的数值计算过程[J].吉首大学学报自然科学版,0,(): 10-14.

版权所有 © 2012 《吉首大学学报（自然科学版）》编辑部  
通讯地址：湖南省吉首市人民南路120号《吉首大学学报》编辑部 邮编：416000  
电话传真：0743-8563684 E-mail: xb8563684@163.com 办公QQ: 1944107525  
本系统由北京玛格泰克科技发展有限公司设计开发 技术支持: support@magtech.com.cn